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ABSTRACT

The Self-Schedule System is an instructional-learning management "tool" designed to implement the curriculum components of an individualized early learning program. The overall concern of the system is to provide ecological supports which enable the teacher to adapt instruction to individual students, and encourage students to assume increasing responsibilities for their own learning. The curriculum is described in terms of the teacher prescribed "perspective learning" component and the student-selected "exploratory learning" component. Curriculum objectives concerned with the development of general cognitive and socio-emotional skills are given. Teacher and student functions are described. Teacher functions focus on planning the general classroom learning environment and implementing and adapting the program to the individual student. Student functions are characterized under two broad categories: the passive and active learner roles. A behavior hierarchy of key competencies the students need to acquire to function effectively is also presented. (SDH)

# THE RATIONALE AND DESIGN OF THE SELF-SCHEDULE SYSTEM

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# THE RATIONALE AND DESIGN OF THE SELF-SCHEDULE SYSTEM

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## Rationale and Purpose

The Self-Schedule System is an instructional-learning management system designed to implement the LRDC Individualized Instructional Program[1] in the early learning grades (preschool through grade two). The Self-Schedule System is designed with the rationale that the adequacy and the effectiveness of an instructional-learning management system is the key, not only to the successful implementation of any educational program designed to adapt to the learning needs of the individual student but, more importantly, to the development of the student's ability to interact with, to manage, and to control the learning environment. The

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[1] The individualized instructional program reported in this paper is designed by the Learning Research and Development Center (LRDC) at the University of Pittsburgh. The specific aim of the work in the development of the LRDC Individualized Instructional Program is to design, build, and evaluate prototype educational environments for elementary school children (preschool through grade 6). These environments require the following essential characteristics; they must: (1) be adaptive to individual differences in students, (2) provide for the continuous intellectual growth of all students, (3) be as transparent as possible in terms of why they work, (4) be validated in terms of their effectiveness, and (5) be within the financial reach of school systems. The R & D activities in the development of such a program include the specification and organization of instructional objectives, the identification and tryout of available instructional resources, the design and development of needed instructional resources, the development of assessment procedures for the defined objectives, and the definition of teacher requirements in individualized educational environments.

use of the word "management" in this context refers to the management of the instructional-learning environment, as well as the instructional-learning process.

To find a way or ways to effectively implement all aspects of an educational program in school settings is a common concern of educators in general, and innovative educational program developers in particular. However, because of the diverse nature of the curriculum components included in the LRDC Individualized Instructional Program and the wide spectrum of curriculum objectives included in each component, the need to deal with the problem of implementing the program components in an integrated and complementary fashion is greatly magnified. The Self-Schedule System is specifically designed to deal with the implementation aspects of our program.

## The Curriculum

The curriculum of the LRDC Individualized Instructional Program for the early learning grades is particularly concerned with the acquisition of basic skills in several subject areas, the development of increasing competence in self-directed learning, and the development of certain general cognitive and social skills that are essential for the continued intellectual and social growth of young children. At present, the curriculum consists of two major components. They are the teacher prescribed "prescriptive learning" component and the student-selected "exploratory learning" component.

The prescriptive learning component includes such basic skills areas as perceptual skills, classification and communication skills, beginning reading skills, and beginning mathematics skills. Detailed descriptions of each of the basic skills areas have been reported in

several other papers (Beck & Mitroff, 1972; Lindvall & Bolvin, 1966; Resnick, Wang, & Kaplan, 1973; Rosner, 1972; Wang, 1972). In general, the prescriptive learning component deals with those basic "learning to learn" skills that are considered necessary for success in later subject-matter learning in school. Learning activities included in the prescriptive component are highly structured and task specific in nature. They are hierarchically sequenced and, in general, the manner in which the tasks are to be carried out is explicitly specified.

The exploratory learning component, on the other hand, is concerned with the development of the more generalizable and non-subject-matter related cognitive skills and socio-emotional growth of the student, with particular emphasis on the development of competencies in self-directed learning. Learning activities included in the exploratory learning component are generally more open-ended and non-task specific. The rationale and detailed descriptions of the exploratory learning component can be found in a paper by Wang, Mazza, Leinhardt, and Millmore (1971). Since a great number of objectives included in the exploratory learning component are developed through the implementation of the Self-Schedule System, it is important to briefly describe the curriculum content of the exploratory learning component of our program here. Curriculum objectives included in the exploratory learning component are related to three topic areas: general cognitive growth, socio-emotional growth, and the development of competencies in self-directed learning.

Curriculum objectives concerned with the development of general cognitive skills are designed to enhance generalized skills in communication and problem solving, as well as generalized skills in orienting and attending. Specifically, general cognitive skills include the following:

1. Functional language skills

   a. Uses language to seek and give information.

   b. Follows and gives verbal directions.

   c. Uses language to describe events, objects, relationships, causes and effects, similarities and differences, time, location, functions, physical attributes, actions, feelings, and emotions.

   d. Uses language to express and communicate thoughts, ideas, concepts, rationale, plans, and decisions to others.

   e. Uses language to relate to past experiences and make predictions about the future.

   f. Uses language to persuade, debate, and make demands.

   g. Uses language to establish effective social interactions.

2. Attending skills

   a. Works on a task for increasingly extended periods of time.

   b. Works on a task until completion.

   c. Focuses attention on dimensions relevant to the task at hand.

   d. Persists to work on the task at hand when faced with a reasonable amount of frustration.

   e. Ignores distraction or irrelevant dimensions of a particular stimulus.

   f. Tolerates delayed and infrequent reinforcement.

3. Memory

   a. Recognizes familiar objects and properties from auditory, visual, and tactual kinesthetic inputs.

   b. Recalls past events, acts, and information, concepts and relations, solutions to problems, effects associated with past experiences, and specific facts.

   c. Develops strategies to facilitate memory: naming, association, visual imagery, grouping, etc.

4. Problem solving skills

   a. Uses reflective modes to generate solutions to problems:

      (1) Searches for possible solutions through systematic observation.

      (2) Tolerates delayed reinforcement.

      (3) Persists in finding solutions to the problem.

   b. Generates hypotheses.

   c. Generates alternatives.

   d. Tests hypotheses with alternative solution strategies.

   e. Considers possible options available for solving a particular problem and predicts possible outcomes.

   f. Evaluates testing outcomes:

      (1) Eliminates irrelevant and ineffective solution alternatives.

      (2) Uses evaluative inputs to make decisions on the selection of solution strategy.

g. Solves the problem using the strategy he/she has decided to be most efficient and effective.

h. Persists until the problem is solved.

i. Persists to find other solution strategies if one particular choice of strategy is found to be ineffective in solving the problem.

One important focus of the exploratory learning component is in the area of socio-emotional growth. This aspect of the program is concerned with the student's ability to live in harmony with himself/herself and with others in the social environment of which he/she is a part. Program objectives related to the student's socio-emotional development include:

1. Cooperative interaction

   a. Shares materials with others.

   b. Shares ideas and activities with others.

   c. Assists others when asked.

   d. Works well with others together on the same project.

   e. Works well among others who are working on different projects.

   f. Permits others to imitate what he/she has created.

   g. Develops "give and take" attitude when working in a group.

   h. Offers assistance to someone who needs help.

   i. Takes turns when necessary and gives others a chance to take turns.

j. Offers constructive ideas and suggestions to others.

2. Adaptive interaction

a. Accepts help from others when needed.

b. Feels free to imitate other children's ways of using materials and manners in which a given activity is carried out.

c. Persuades others to carry out their ideas in a socially acceptable manner.

d. Directs emotional stress through positive and socially acceptable channels.

e. Accepts constructive criticism.

f. Tolerates and permits others to do things differently.

g. Recognizes that people differ in many ways (e.g., physical features, ethnic and cultural backgrounds, needs, interests, competencies, etc.), and one should accept the differences as unique to each individual, and "adjust" to the differences rather than make judgments about the differences.

3. Affiliative interaction

a. Respects other people's feelings and ideas.

b. Desires to interact with others.

c. Relates and interacts with others.

d. Communicates with others about his/her feelings, ideas, and needs.

e. Shows empathy and sensitivity for other people's feelings, ideas, and needs.

f. Identifies with the group (e.g., peer, ethnic, cultural groups, etc.).

4. Positive self-image--the ability to perceive oneself as:

a. A person capable of coping with and controlling the environment.

b. A person who is well-respected, well-liked, and well-accepted by others (peers and adults).

c. A person who knows his/her own goals and is capable of achieving those goals.

d. A person who understands his/her own motives, feelings, and behaviors.

e. A person who has the ability to get along with others (peers and adults).

f. A person who is a contributing member of his/her group.

g. A person who identifies with his/her peer group.

h. A person who identifies with his/her particular ethnic and cultural heritage.

i. A person who has some special ability that can be offered to his/her social group.

j. A person who is responsible.

k. A person who has the ability to learn (in and out of school).

l. A person who has the ability to make decisions about his/her own learning.

m. A person who has the ability to carry out his/her own plans independently.

n. A person who has the ability to understand and follow directions.

o. A person who has the ability to say "no" when disagreeing with others.

p. A person who is creative.

q. A person who is a capable problem solver.

r. A person who has the ability to communicate his/her feelings, thoughts, needs, and opinions to others.

s. A person who has the ability to understand other people's feelings, thoughts, needs, and opinions.

The objectives included under the general topic of self-directed learning are concerned with the student's ability to manage and to exert control over his/her own learning. The central aim is to increase the student's ability to take the responsibility for planning and self-management of his/her own learning. The focus is placed on the development of those independent learning skills that are prerequisite skills for self-directed learning. Therefore, the curriculum objectives included are designed to help the students develop: (1) the ability to manage and control the learning resources and the learning environment, (2) the ability to make choices and decisions with respect to the nature of the learning activities, and the time, place, and manner in which the activities are carried out, and (3) the ability to take increasing responsibility for their own learning. Major categories of behavioral objectives are:

1. The student's ability to carry out learning tasks assigned to him/her with minimum assistance from the teacher. This category includes the development of the abilities to:

   a. Attend to the task instructions.

   b. Carry out the task according to instructions.

   c. Request help (from teacher or another student) when needed.

   d. Persist until one task is completed before moving to another task.

2. The student's ability to structure his/her own learning plans with minimum assistance from the teacher. This category includes the abilities to:

   a. Decide which task(s) he/she wants to accomplish for the school day.

   b. Decide the specific time during the school day in which he/she plans to carr · out which particular task.

   c. Make long-range learning plans (for several days, a week, and/or longer).

3. The student's ability to carry out the learning plans he/she has structured with minimum assistance from the teacher. This category includes the development of the abilities to:

   a. Get the materials needed to perform the task(s).

   b. Find the work space needed.

   c. Wait for his/her turn to use materials and spaces if they are not available, and make alternative plans to adapt to the limits set by the situation.

d. Perform the task.

e. Request help (from the teacher or another student) when needed.

f. Follow specific rules and directions in using a particular piece of equipment and/or materials.

g. Fulfill task appropriate materials management responsibilities.

h. Persist until one task is completed before moving to another; make revisions in his/her learning plans if necessary.

4. The student's ability to evaluate his/her own work. This category includes the development of the abilities to:

   a. Evaluate each step of his/her own work according to the learning plans.

   b. Evaluate outcomes of his/her own work in terms of the learning goals and the commitments he/she has made.

Examples of prescriptive and exploratory learning tasks are included in Appendix A.

## The Goals of the Self-Schedule System

Students in classrooms operating under the LRDC Individualized Instructional Program generally spend the bulk of their school day working independently on individual assignments prescribed by the teacher in the various prescriptive learning areas. The remaining school time is divided between exploratory learning activities and working with teachers (one to one or in a group) for testing or tutoring purposes. Because of

the individualized nature of the instructional program, students generally engage in different types and different levels of learning activities and, consequently, our program places great demands on teacher time for instructing and managing the learning of each student as specified by the curricular components, and to adapt the instruction to meet the learning needs of each individual student. Therefore, the Self-Schedule System is primarily aimed to provide workable management "tools" with which both the teacher and the students can experience success in achieving the specific objectives included in the various curriculum components.

"Successful teaching experiences" under the LRDC Individualized Instructional Program means that the teacher is able to: (1) adapt the instruction and the learning environment to the individual student's needs, interests, styles, and competencies; (2) provide a greater flexibility in the planning of the individual student's learning programs, in the use of school time, space, materials, and activities, while at the same time insure mastery of basic skills included in the various basic skills curricula; (3) provide the learning opportunities and create a psychological climate that is conducive to fostering in students those general cognitive, social, and independent learning skills included in the exploratory learning component of the program; and (4) carry out the specific instructional roles specified by each of the curriculum components, while at the same time implement all aspects of the program in an integrated and complementary fashion.

"Successful learning experiences" for the student means that the student is able to: (1) achieve mastery of the basic skills included in the prescriptive learning component, (2) develop the self-confidence in his/her ability to achieve in school, (3) acquire self-management skills required to function in classrooms operating under the LRDC Individual-

ized Instructional Program, (4) develop independent learning skills to carry out and complete his/her learning tasks with minimum assistance from the teac. r, (5) develop self-directed learning skills to plan and evaluate his/her own learning, (6) develop the motivation to acquire new skills and knowledge with intrinsic interest and personal involvement, as well as the persistence to work on a task or solve a problem until completion, (7) acquire the competencies to communicate with and relate to others (peers and adults), and (8) develop social skills to work and interact with others (peers and adults).

The Self-Schedule System is specifically designed to facilitate the achievement of the following program goals:

1. To provide opportunities for the student to acquire and to use the skills included in the various basic prescriptive and exploratory learning components in a variety of contexts which cut across formal curriculum boundaries, so that the student can learn to make connections, integrate the competencies he/she has acquired, and apply them in practical situations.

2. To make available a spectrum of curricula alternatives at all times which permits the student to experiment with a variety of learning activities and materials, and provides the student with firsthand experiences in making his/her own decisions on the type of learning tasks he/she wants to work on, and to adapt to the approaches to learning that seem most interesting and gratifying to him/her.

3. To provide a learning environment that permits the student to experience success and failure in a variety of learning activities under varied learning situations so that he/she can

experience and experiment with different ways of handling success and failure in what he/she does.

4. To provide opportunities for the student to select, structure, and define the tasks in the way he/she wants to carry them out, strategies he/she is going to use to carry out plans, and evaluation of his/her learning outcomes with minimum assistance from the teacher.

5. To provide opportunities for the student to work with peers in developing cooperative plans to achieve a common goal.

6. To provide opportunities for the student to experience spontaneous interaction with peers, and to acquire mastery of certain social skills necessary to adjust and adapt in his/her social environment.

7. To provide opportunities and learning conditions in which the student can acquire the independent and self-directed learning skills that are necessary to function in the classrooms operating under an individualized instructional model.

## The Design

The Self-Schedule System is designed with the following assumptions:

1. That to provide educational experiences that are adaptive to the learning needs, interests, competencies, and learning rate of each student, alternative learning environments (e.g., a variety of learning activities of different natures and contents) must be made available to students at all times during the school day.

2. That to develop competence in self-directed learning, the student must be given the opportunity to develop skills in making choices among learning alternatives, making plans for his/her own learning, scheduling his/her own activities, and increasing management of his/her own learning independently.

3. That one way to increase teacher time for instructional purposes is to transfer most of the traditional teacher management duties, such as scheduling, distributing learning materials, enforcing class management rules, etc., to students.

4. That to provide flexibility in the instructional-learning processes demands careful preplanning on the part of the teacher and a certain degree of structure in terms of the management of the learning environment (e.g., the use of instructional-learning materials, the use of classroom space, procedures for using certain equipment, etc.).

5. That explicit statements about the expected teacher and student roles and their classroom behaviors will not only increase efficiency, adaptability, and flexibility within the implementation of the program in classroom settings, but will also increase the instructional-learning processes.

Under the Self-Schedule System, no specific time is scheduled for any given type of activity. Opportunity is provided for the student to take responsibility in scheduling his/her own pace during the school day (i.e., the student can decide when to work on the learning activities prescribed by the teacher in the various prescriptive curricula, and when to work on the extended learning tasks of his/her own choice). In other

words, under the Self-Schedule System, the students are given the opportunity to make their own decisions on when they will do what; however, some parts of the what are prescribed by the teacher.

The student is expected to complete all the assignments prescribed by the teacher for a given day (or for a given week for those students who are capable of handling learning plans for a longer time range), and some selected exploratory learning activities or projects of his/her own choice in any given school day (or given week). The amount of exploratory learning activities or projects expected to be completed each day or each week is predetermined by the student with teacher guidance. Therefore, under this system, the students and teachers are given greater flexibility in the use of school time. This greater flexibility means that increased responsibility for planning and self-monitoring is placed upon each student, and a concomitant responsibility of guidance is placed upon the teacher. Formal prescriptive assignments under the Self-Schedule System simply become part of a general learning plan adopted on an individual basis for each student, with inputs from both the teacher and the student.

One of the key features of the Self-Schedule System is in the explicit specification of the teacher functions and the student functions under the system. The functions under the various teacher and student roles are specified on the basis of certain theoretical assumptions, and on the basis of feedback information obtained from our field testing experiences in implementing the LRDC Individualized Instructional Program in school settings.

## Teacher Functions

The central functions of the teachers under the Self-Schedule System focus on planning the general classroom learning environment

and implementing and adapting the LRDC program to the individual student. The functions can be categorized under two general categories of teacher roles: the management role and the instructional role.

Management role. Under the management role, two sets of teacher functions have been identified: the "stage setter" functions and the "manager" functions. Both sets of functions are considered as prerequisites for establishing an effective system for managing the instructional-learning processes of our program in classroom settings.

The "stage setter" functions include the provision of materials and equipment for the various components of the program, their physical arrangement, display and storage, and their maintenance. These are activities best carried out by the teacher before and after school when the students are not present. Some specific "stage setter" functions for which the teacher is responsible are:

1. Designing and setting up material displays and storage systems for each curricular area included in the prescriptive and exploratory components (e.g., math, classification, reading, perceptual, etc., for prescriptive learning; block construction, art, dramatic play, etc., for exploratory learning). The design and display should be set up in such a way that the materials are easily accessible and inviting to students. Material storage and material display are viewed as critical environmental supports for fostering the development of the student's independent learning skills and, more importantly, the student's motivation to learn independently.

2. Making frequent and systematic changes of the learning materials included in each learning area (activity center). Changing materials on a regular basis serves to maintain

student interests in the activities of each area, to increase the opportunities of different learning experiences, as well as to make sure that some learning experiences are provided to accommodate differences in the student's competencies and preferences.

3. Making regular inspections of materials and equipment to make sure that those items needed for the various learning activities are in working condition.

4. Designating specific work space and material storage space for the various curricular components so that students not only know exactly where to obtain and store the learning materials for each curricular area, but also find their own work space for the various learning activities they want to carry out with a minimum amount of teacher supervision.

The "manager" functions are those carried out directly with the students. They include such functions as demonstrating and explaining rules and the use of materials, and praising or otherwise reinforcing students for appropriate self-management activities. Among the various functions listed under the management role, training students in the self-management routines of the classroom is of major importance, particularly at the beginning of the school year. As the students make progress in acquiring the required self-management skills, the management training task gradually becomes one of merely maintaining an already established routine. Specific "manager" functions for which the teacher is responsible include:

1. Specifying classroom rules and making sure that the rules are made explicit to each student. In order to provide a learning environment within which the students can move

about freely and make appropriate choices (in what they want to do, when to do it, and with whom, and in what manner), the students need to know exactly the limits in environmental resources (materials, space, etc.), as well as classroom regulations and rules for carrying out the task they have selected to do. For example, to avoid possible conflicts in the use of certain materials or learning areas, the teacher can set a limit to the number of students who can work in a given activity area at any given time. This can be accomplished either by posting a sign in each activity area with a number on it to indicate the maximum number of students allowed to be in the area at any given time, or by setting up a ticket system so that students can independently obtain a ticket to get into each of the activity areas; the maximum number of students allowed in each area at any given time is controlled by the number of tickets made available to students.

2. Specifying student materials and equipment management responsibilities and helping the students to acquire the required self-management skills. A great deal of material and equipment management problems can be eliminated if steps are taken to make sure that every student has acquired the skills to manage the learning materials, and to operate the learning equipment independently. Examples of teacher functions under this category may include: (a) demonstrating the proper procedures for using certain equipment and materials (e.g., how to operate a cassette recorder, how to use materials to construct papier-mâché structures, etc.); (b) setting up clean-up rules for each of the activity areas; and (c) delegating routine material management duties among

students (e.g., cleaning paint brushes at the end of the day, vacuuming the rugs, putting the materials and equipment back on the shelves, etc.).

3. Establishing criteria and contingencies for work completion. In order to foster the development of increasing competencies in self-directed learning on the part of the students, explicit statements about the expected behavior outcomes of the learning activities included in the program should be made so that each student can evaluate his/her own work performance and make appropriate plans for his/her own learning. For example, specific contingencies for task completion should be made explicit to the students--requirements of the number of prescriptive learning tasks and exploratory learning tasks to be completed within a certain specified time (for a block of time, a school day, or a week) should be specified. The criteria and contingencies may be the following:

   a. Students are required to complete all of the assignments listed on the prescription ticket for each subject area, and a minimum number of exploratory activities (two or three) for a given day.

   b. When a student has completed the specified amount of work (prescriptive and exploratory) and has the work checked off by the teacher, he/she may choose any type of task to work on for the rest of the day.

   c. If a student frequently does not complete the specified amount of work within the time limits, the teacher may want to do the following:

(1) Use a persistent reminding technique, stating to each student as he/she circulates among them: "You have two more hours to finish your work. . . ." "You did not have enough time to finish your work yesterday; be sure you give yourself enough time . . . ." "You have completed two reading tasks; you have two exploratory, one reading, and three math tasks to do. . . ."

(2) Meet with the student at the beginning of the day and work out a plan for the day with him/her.

(3) If necessary, "suggest" that the student complete certain tasks (prescriptive or exploratory) before choosing the next activity. The teacher may state: "You have completed one exploratory task and one reading; that's very good." "You have only one hour to finish everything you are supposed to do today." "Maybe you should finish this building right away and do some math work."

4. Establishing a specific time schedule for certain activities. For management purposes and the proper use of teacher and student time, the teacher may decide certain activities areas may be closed for a certain period of the day. For example: (a) some part of the construction and block building area (e.g., the wood shop) may not be used until after 10:00 a.m. each morning, (b) clean-up time for the painting area is 11:00 a.m., and (c) no one is allowed to begin painting after 10:50 a.m.

Instructional role. It is useful to distinguish two types of instructional functions which we have called the "didactic" and the "consultant" functions.

In the role of the didactic instructor, the teacher gives the various diagnostic tests associated with the formal curricula, prescribes learning tasks on a daily basis, checks prescriptive activities, and gives instructional help on them as required. The didactic instructor also conducts special tutoring sessions on specific objectives and may conduct large or small group lessons as required by individual students and provided by the program. Teacher functions grouped under this category are related for the most part to the implementation of the various prescriptive curricula. The tasks are generally preplanned. They include administering diagnostic tests and instructing students on a specific task to insure student mastery of a specific curriculum objective. Some specific examples of didactic instructional functions are:

1. Giving placement and diagnostic tests using procedures outlined in the teacher's manual prepared for the various prescriptive curricula (i.e., reading, math, classification, perceptual skills, etc.).
2. Prescribing appropriate learning tasks for individual students on the basis of diagnostic test results.
3. Checking individual student's prescriptive work.
4. Assisting and answering questions for those students who need help.
5. Tutoring students who need special help.
6. Conducting small and large group lessons on a specific subject matter.

7. Modeling, demonstrating, and instructing on the specific use of materials and equipment.

The consultant role is less highly structured. It is carried out by the teacher while circulating among the individual students. In this role, the teacher focuses on tasks such as observation of students' learning processes, evaluation of outcomes beyond what is specified in the formal tasks, questioning and probing to stimulate the development of self-direction and problem solving activities on the part of the students, engaging in planning with students and helping them to decide what to do and how to do it, posing problems for students to solve, and participating in learning activities with the students. The functions listed under this category generally are carried out on an informal basis, and they are not preplanned. The teacher assumes with this category the consultant or program adviser role. Examples of specific functions are:

1. Observing student learning processes to learn what the student is seeing and asking.
2. Questioning, probing, and stimulating the student to work on learning tasks that require increasingly higher levels of competencies in the various prescriptive and exploratory curricular components.
3. Planning with the students in the area they select to work.
4. Providing a wide range of suggested alternatives from which the students can select.
5. Providing opportunity for the students to do what they select to do (space, materials, resource information, etc.).
6. Assisting and answering questions for students who need help.

7. Suggesting specific learning tasks for the students to select from when they are not sure about what they want to do.

8. Discussing with the students the progress they have made in their learning.

9. Evaluating and discussing learning outcomes with the students.

10. Providing guidance and direction on management, as well as instructional matters when necessary.

Procedures for carrying out the various teacher functions in classroom settings. Ideally, to efficiently implement the Self-Schedule System in classroom settings, two adults are required in each classroom. Typically, these two adults would be a teacher and an aide or an assistant teacher. Since the current trend in this country's public elementary schools is moving toward the provision of two adults for each classroom, it is our hypothesis that to include two adults in the design of the Self-Schedule System will prove to be a more useful and appropriate model for managing the instructional-learning processes in classroom learning environments.

Theoretically, according to the design of the Self-Schedule System, at any given time during the school day, at least one of the adults circulates among the students and devotes himself/herself largely to the teacher functions listed under the consultant role and the manager role. The key task for this adult is to interact with individual students, generally quite briefly, to check their work in both prescriptive and exploratory tasks, to assist, instruct, or ask questions, and other related instructional and management tasks. This adult is given the title of "the traveling teacher."

The second adult in the classroom generally works intensively with individual or small groups of students, carrying out the various teacher functions listed under the didactic instructional role. This person devotes most of the school time to administering tests, tutoring individual students, giving group lessons, or helping a group on a special exploratory learning project. The teacher who performs these didactic instructional functions is given the title of "the testing and tutoring teacher."

These are, of course, "idealized" descriptions of what the teachers do in implementing the program. In practice, the two adults alternate from one mode of interaction to the other as the need arises. Separation of the functions for each adult in the classroom, nevertheless, serves to characterize in a general way the various teacher functions to be observed under the Self-Schedule System. During each school day, the two adults can take turns serving as "the testing and tutoring teacher" or "the traveling teacher." The decision of which person takes what role should be made on the basis of mutual agreement between the teacher and the aide or assistant teacher in the room. They may, for example, exchange roles on a systematic basis (weekly or daily), or assign particular functions to each person according to their own preferences and competencies. However, it is essential that both adults meet together on a daily basis to discuss their schedules and make definite plans for carrying out the various teacher functions. Teacher efficiency in the management of the instructional-learning process depends a great deal on planning. For example, if Mondays are regular days when the teacher makes changes in the activities and materials of the various exploratory learning areas, group demonstration lessons should be scheduled in the morning to explain to students about the new materials and/or equipment, so that students can carry out the activity using the

new materials and equipment independently. If testing is scheduled for Wednesday and Friday of each week, then on Monday, Tuesday, and Thursday, the testing teacher can spend more time tutoring in basic skills (e.g., reading) and working with the students in exploratory learning.

Although the preplanning of teacher activities is important, the teachers must be flexible in making changes in their plans to meet the changing needs of the students. For example, if most of the students who choose to work independently seem to be working well on their own, and if the traveling teacher feels certain students would benefit from some intensive interactions with him/her, there is no reason why the traveling teacher cannot stop circulating and spend a few minutes with those students. On the other hand, if the tutoring and testing teacher, while having a tutoring lesson with someone, notices that another student is expressing an urgent need for teacher assistance and the traveling teacher is preoccupied, the teacher can stop the tutoring temporarily to attend to the student. While it is important that the traveling teacher and the testing and tutoring teacher be available to all students for special help on an "emergency" basis, they also should feel free to tell the students to wait for a while until they are able to see them. To eliminate some of the scheduling problems, however, it is useful to establish specific rules and time schedules for certain types of teacher functions that require an extended amount of teacher time (e.g., taking dictation, reading stories, etc.), and make these schedules and rules explicit to the students.

## Student Functions

The student's role in the implementation of the Self-Schedule System is one of the major points of consideration in the design of the system. Among the student learning outcomes the system is designed

to achieve is the development, on the part of the student, of the realization of having actual control of what he/she does in school, and actively participating in planning and carrying out learning activities with a minimum amount of supervision and direction from the teacher. Student behaviors under the Self-Schedule System can be characterized under two broad categories: the passive and the active learner roles.

Active learner role. Under the active learner role, the student is expected to:

1. Decide when to do what task. Once the student decides what he/she wants to do first (prescribed learning activity or any given subject of his/her own choice), he/she has the following alternatives: (a) to complete all the prescribed assignments before doing any exploratory learning task of his/her own choice; (b) to work on some (one, two, or more) exploratory learning tasks before working on the prescribed assignments; or (c) to switch back and forth between the two types of learning tasks (exploratory and prescriptive).

2. Get the teacher (or other students) to: (a) check his/her prescribed work when an assignment is completed; (b) check work he/she has completed in a self-selected exploratory learning task; and (c) answer questions, provide guidance (demonstate, etc.) when assistance is needed.

4. Assist others (in response to requests or voluntarily) in management and/or instructional tasks.

5. Evaluate outcomes and consequences of his/her learning behaviors and make adjustments to his/her learning plans on the basis of self-evaluation.

Passive learner role. Under the passive learner role, the student is expected to:

1. Take tests when asked by the teacher.
2. Participate in individual tutoring sessions when asked by the teacher.
3. Participate in group activities when required (group lessons, activities involving the whole class, etc.).
4. Follow specific directions given by the teacher on certain learning and/or management tasks.

Skills required to carry out the specified student functions. To function effectively under the Self-Schedule System, the student needs to acquire certain prerequisite self-management skills, in addition to those competencies listed under the self-directed learning skills of the exploratory learning component of our program. They are:

1. The ability to budget time and estimate the amounts of time needed for the different types of activities.
2. The ability to meet the responsibility of completing assignments within the specified time constraints (one period, one day, or one week).
3. The ability to delay or stop working on activities of his/her own choice for certain amounts of time in order to complete the required assignments.
4. The ability to make increasingly long-range plans for his/her own learning in school.

A behavior hierarchy (Figure 1) of the key competencies the students need to acquire in order to function effectively under the Self-

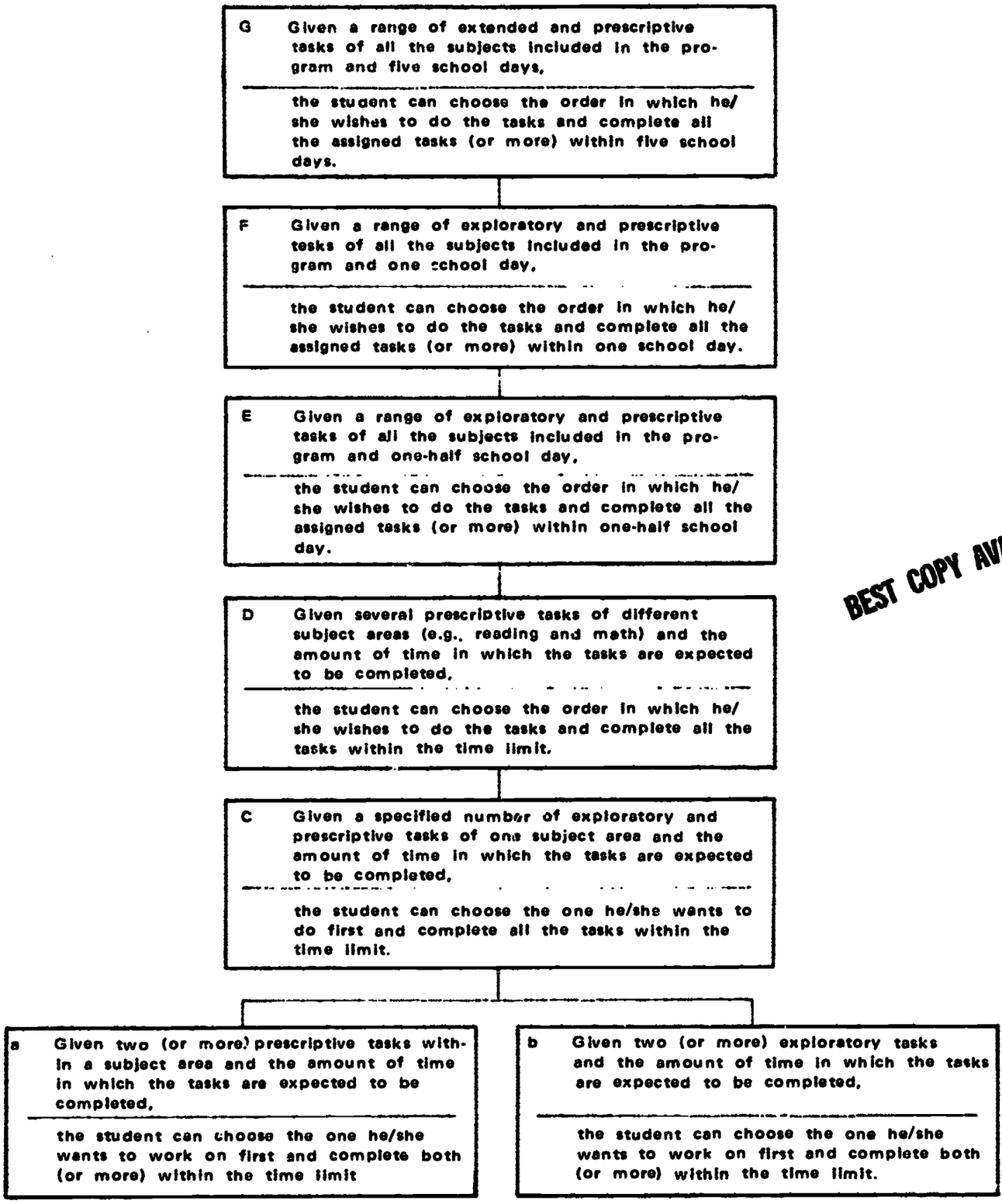




Figure 1. Hierarchy of student behaviors required under the Self-Schedule System.

Schedule System has been developed. The hierarchy will serve as a guideline for training students to achieve mastery of the criterion behaviors listed in the behavior hierarchy. The differences in the level of difficulty of the objectives included in the hierarchy lie in the difference in the range of task options, the number of tasks to be completed, and the length of time given for completing the chosen tasks.

According to our analysis, Objective A and/or Objective B constitute the initial steps in training students to acquire the competencies included in the behavior hierarchy. The speed at which the students can move through the hierarchy depends on the rate of progress the student can make in achieving the competencies defined in each step of the hierarchy. The students are required to achieve mastery of the lowest objectives in the hierarchy before moving on to the next objective listed. Therefore, according to our analysis, in order to train students to acquire the behaviors listed in Objective C, the students must first achieve mastery of Objectives A and B.

Behavioral Objectives

> Objective A: Given two (or more) prescriptive tasks within a subject area and the amount of time in which the tasks are expected to be completed, the student can choose the one he/she wants to work on first and complete both (or more) within the time limit.

To provide the opportunity for students to achieve mastery of Objective A, the teacher may begin with one prescriptive curriculum area (e.g., the math curriculum for a first grade) for a period of 40 minutes to one hour a day. Within the time period, the student is given the opportunity to make decisions about when to do what among a specific array of prescribed assignments (e.g., for first or second grade,

options may be a math box, worksheets in math, booklets, practice sheets for math maintenance skills, etc.). The teacher should make it very clear that the student must complete all the prescribed tasks within the time limit. Under this objective, the student's choice is limited in deciding "when to do which assignment." In other words, the students are not given the option to decide "not to" complete some part of the assignment.

> Objective B: Given two (or more) exploratory tasks and the amount of time in which the tasks are expected to be completed, the student can choose the one he/she wants to work on first and complete both (or more) within the time limit.

To provide the opportunity for students to achieve mastery of Objective B, the teacher may begin to schedule a limited amount of time (e.g., for first grade, the time can be 40 minutes to one hour a day) designated as the "exploratory learning activity time." Within the time limit, the student is given the opportunity to choose a specified number of activities (two or more) among an array of learning activities (e.g., games, block construction, painting, etc.).

The teacher must make it clear to the students that although they may choose what they want do do, they are required to complete the task they have selected to do before they switch to another task. It is also important for the teacher to specify the minimum number of tasks he/she expects each student to complete within the time period, so that the students can realistically budget their time. In addition, because of the unstructured nature of the exploratory learning activities, it is crucial for the teacher to specify the criteria for determining task completion for each type of exploratory learning activity (e.g., one block structure, one painting, one game, etc.). The competencies Objective B aims to

develop include the ability to (1) decide what to do, (2) complete one thing the student has selected to do before switching to another activity, and (3) complete the minimum number of activities required for the specified time period.

> Objective C: Given two (or more) exploratory and prescriptive tasks for one subject area, and the amount of time in which the tasks are expected to be completed, the student can choose the one he/she wants to do first and complete all the tasks within the time limit.

Objective C is designed to provide the student with the opportunity to choose between both types of learning activities (prescriptive and exploratory) and the opportunity to complete some task of the student's choice, and tasks specifically assigned to him during a given time period. The length of the time should be longer than the time allotted for Objective A or Objective B. If the required number of tasks the student is to complete are the same as Objectives A and B combined, then the student should be given the same amount of time allotted for Objectives A and B (80 minutes). Objective C is designed to integrate prescriptive and exploratory learning activities within the same time segment. Students are given the opportunity to choose when to do which activity, among several prescriptive tasks and a wide range of exploratory learning options. The teacher must make the following expectations explicit to the students when training the students to achieve mastery of Objective C:

1. Students are expected to complete all the assignments prescribed for them within the time period allotted.
2. Students are expected to complete a specified number (two) or more) of exploratory learning activities within the time period allotted.

3. Each student has the responsibility to make full use of the time allotted to complete at least all the tasks required.

4. Each student has the responsibility to plan when he/she should do what within the specified time period. For example, the student may choose to do one exploratory activity and after completion, he/she can do one or two prescribed assignments before getting into another exploratory activity.

5. Students are encouraged to choose more tasks to work with than the minimum number expected of them. They can choose to work on additional exploratory or prescriptive tasks.

Objective D: Given two (or more) prescriptive tasks of different subject areas and the amount of time in which the tasks are expected to be completed, the student can choose the one he/she wants to work on first and complete all other required tasks within the time limit.

Objective D is designed to provide the opportunity for the students to plan for the work sequence of their prescriptive learning tasks assigned to them. The prescriptive tasks include tasks from different curriculum areas (e.g., for first grade it could be reading and math). To achieve mastery of Objective D, the student should be able to (1) complete all the assigned tasks for each subject area within the specified time period, and (2) make plans to sequence the assignments in the order he/she prefers to carry them out and follow the preplanned order until all the assignments are completed (e.g., the student may choose to finish all the math assignments before beginning his/her reading assignments, or the student may schedule the assignments in mixed sequence).

Objective E: Given the exploratory and prescriptive tasks of all subjects included in the program and one-half of the school day, the student can choose the order in which he/she wishes to do the tasks and complete all the assigned tasks (or more) within one-half school day.

When the student has achieved mastery of Objective E, he is considered to have acquired the minimum level of competencies in carrying out the student roles specified for the Self-Schedule System. For students in preschool, kindergarten, and the first half of the first grade year, perhaps this is the maximum level of competency one may expect. Objective E is designed to develop the student's ability to plan for his/her learning activities for one-half of the school day, choosing what he/she wants to work with among prescriptive assignments of two or more curriculum areas and a wide range of exploratory learning activities. Criterion behaviors for Objective E include the student's ability to:

1. Move from one task to another with self-direction and a minimum of assistance from the teacher.
2. Make specific plans for sequencing the activities and communicate the plans to others.
3. Assess the outcome of completed work against his/her own work plans.
4. Complete all the prescriptive learning activities assigned for the half day.
5. Complete the minimum number of exploratory learning tasks specified for the time period.

Objective F: Given a range of exploratory and prescriptive tasks of all the subjects included in the program and one school day, the student can choose the order in which he/she

wishes to do the tasks and complete all the assigned tasks (or more) within one school day.

Objective F is designed to develop the student's responsibility for planning his/her own learning for a much longer period of time. It requires much more advanced planning on the part of the student. The prescriptive learning tasks for Objective F included all the curriculum areas (e.g., reading, math, spelling, perceptual, etc.). The students are given the whole day to complete all the assignments and a specified number of exploratory learning tasks of their choice. It is important that the teacher continue to be very specific about what he/she expects the students to accomplish for each school day. It is our hypothesis that for most students, Objective F is a realistic objective for students to achieve by the end of first grade.

Objective G: Given a range of exploratory and prescriptive tasks of all the subjects included in the program and a specified number of school days, the student can choose the order in which he/she wishes to do the tasks and complete all the assigned tasks (or more) within the time allotted.

Objective G is the ultimate goal of the Self-Schedule System. However, we do not expect the majority of the first grade students to reach this level even by the end of the school year. It is our hypothesis that once the students achieved mastery of Objective F, it is conceivable that with very little additional training, the students can achieve mastery of Objective G. Objective G is designed to develop the student's ability to carry out a "learning contract" under which the student can make plans for a longer time range (e.g., three days, a week, or a month).

The key role for the teacher in implementing Objective G is in making sure that both the student and the teacher know what to expect at the end of the contract period. Teacher guidance and discussion with

students on every aspect of the learning contract is critical. The learning contract should include a specific list of expected accomplishments as well as the specification of procedures and method of evaluating the outcomes. The contract should be drawn by the students with input from the teacher in a joint planning session.

## Summary and Discussion

The Self-Schedule System is designed as an instructional-learning management "tool" to effectively implement the curriculum components of an individualized early learning program. The overall concern of the system is to provide ecological supports for the teacher to achieve the program goal of adapting instruction to the individual students, and for the students to assume increasing responsibilities for their own learning. If the system is effective, we should be able to observe the following outcomes:

1. Students will interact with teachers significantly more on instructional matters, and less for classroom management purposes.
2. Students will engage in different learning activities, varied in their approaches and content.
3. Students will spend significantly less time "waiting" for the teacher.
4. Students will exhibit more purposeful and attentional behaviors and less disruptive behaviors.
5. Students will exhibit increasing control of their own learning. (Some examples of student behaviors under this category would be to engage in more self-selected activities and complete more tasks.)

6. Students will exhibit increasing mastery of self-management skills. (For example, students will be able to follow prescriptions independently, locate learning materials and equipment, carry out such material management responsibilities as clean up, return used materials to proper storage space, etc., without teacher assistance.)

7. Students will increase their rate of task completion significantly.

8. Students will acquire mastery of skills included in the prescriptive curricula at a faster rate.

9. Students will exhibit increasing amounts of interest and motivation for learning as well as personal involvement. (Some examples of student behaviors under this category would be persistence in working on a task or solving a problem until completion, initiation of learning projects that require a great deal of work and stamina on the part of the students, and an increase in school attendance.)

10. Students will engage in group collaborative projects more frequently.

11. Students will interact with each other more frequently.

12. Students will exhibit increasing levels of mastery in social skills. (Some examples of behaviors would be taking turns using equipment and materials; sharing materials, ideas, and activities; and communicating ideas, needs, and feelings to others in socially acceptable ways.)

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# APPENDIX A

## Prescriptive Learning Tasks

Learning materials for prescriptive tasks are generally packaged individually for each objective, and the directions for both the teacher and the students are explicitly stated. The following are descriptions of some prescriptive tasks included in the beginning math and the classification curriculum.

---

Box: Q I B

Inventory:
- A bag containing two objects.
- A bag containing three objects.
- A bag containing four objects.
- A bag containing five objects.
- A strip of felt.

Task:
The child counts out the number of objects in each bag, moving them out of the set as he/she counts.

Procedure:
1. The child removes the felt from the box and places it to one side of the table.
2. The child removes the bag with two objects from the box and empties the contents on the table.
3. The child counts the objects by:
   a. touching an object and stating the numeral ("one," etc.).
   b. then pushing (or lifting) the object to the felt.
4. The child counts the objects in each of the remaining bags as in No. 3.

To the Teacher:
1. If necessary, demonstrate the counting procedure outlined in No. 3.
2. The child puts the objects back in the appropriate bag after using them.
3. After the child finishes counting each bag of objects on his/her own, pick out one bag at random and question the child.

Questions:
"How many things are in this bag?"
"Count them for me."

Correct Response:
"Two (three, etc.) things," or "I don't remember."

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Box: Q II F

Inventory:
- One 6" x 10¾" card with drawings of varying numbers of objects.
- Three markers (one triangle, one circle, and one square).
- Three audio flash cards.

Task:
A numeral is stated (to 10). The child places a specific marker on the picture showing the set of the size indicated by the numeral.

Procedure:
The child listens to the audio flash cards.

To the Teacher:
1. "Listen carefully and do what they say. You will be counting the objects on this card. Here are your markers."
2. The teacher checks lesson card after the child listens to each flash card and questions the child.

Questions:
1. "Why did you put a triangle (circle, square) on this picture?"
2. "Why didn't you put a triangle (circle, square) on this picture?"

Correct Response:
1. "Because there are seven (ten, eight) things."
2. "Because there aren't seven (ten, eight) things."

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Box: C 3 C 2

Inventory:
- Two Lotto boards with six pictures of objects on each board varying in shade.
- Two sets of matching picture cards that vary in shade.

Teacher Instruction for Student:
The child puts the small picture cards that are exactly the same shade together on the board.

Questions:
1. "What color is this?" (Point to an object.)
2. "Are these two things exactly the same shade?"
3. "Why did you put these two things together?"
4. "Why didn't you put these two things together?"

Correct Response:
1. "This is red."
2. "Yes, they are both light red."
3. "Because they are both dark purple fish."
4. "Because one is a dark purple fish and one is a light purple fish."

Box: C 4 A 2

Inventory:
- One Domino game.
- Twenty picture cards with two drawings of objects varying in shape on each card.

Questions:
1. "Show me a circle."
2. "Point to another circle on one of your cards."
3. "Did you match any squares?" "Point to the squares."
4. "Find two things that are the same and tell me exactly what they are."

Teacher Instruction for Student:

The child matches the shapes at each end of the Domino with the shapes of another Domino.

Correct Response:
1. The child points to a circle.
2. The child points to another circle.
3. "Yes." The child points to two squares.
4. The child points to two robots and says, "This is a robot and this is a robot."

## Exploratory Learning Tasks

Learning tasks for the exploratory learning component are designed around three major categories: (1) activity centers, (2) special projects, and (3) conceptual games.

Activity centers are physically defined spaces in the classroom where materials for particular kinds of activities and tasks are available for self-selected use by the students. Exploratory activities included are designed around such activity centers as: the socio-dramatic and role-play center, the creative arts center, the construction and block building center, the water and sand play center, the center for listening activities (which includes records and cassette tapes for music and stories), and the centers for reading and related language arts activities, math related activities, and science related activities.

Special projects consist of sets of materials designed to encourage extended activity, both imaginative and practical, around them. Examples of themes developed for special projects include: doctors and nurses, the post office, police station, the food we eat, the super market, and the family. Special projects are generally introduced to the entire class at one time, and the props and materials for the projects remain available for several weeks to allow elaborations of the theme to develop. New projects are introduced as interest in the established one wanes. Particularly popular projects are made available on a rotating basis throughout the year. The following is an example of a special project.

---

THE POST OFFICE PROJECT

Materials and Props

1. Large mailbox
2. Date stamp and pad
3. Container of used stamps
4. Adequate supply of paper and envelopes of assorted sizes
5. Small packages of varying weights
6. Scales
7. Mailbag
8. Sorting trays
9. Postman's hat
10. Assorted play money
11. Sharp pencils
12. Make a picture dictionary available
13. Make a list of words that are related to the post office activities available

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Suggested Student Activities

Role of the Postman

| Description of Activity | Related Subjects | | | | | |
|---|---|---|---|---|---|---|
| | Reading and Language Arts | Writing | Creative Arts | Social Studies | Math | Socio-Dramatic and Communications |
| Write a letter inviting a mailman to speak to the class. | | X | | X | | X |
| Read the resource books aloud to others. | X | | | X | | X |
| Draw a picture of a mailman at work. | | | X | X | | X |
| Deliver the classroom mail. | | | | X | | |
| Count the letters that have been written. | | | | | X | |
| Write down the titles of all the books about the mailman that have been read. | X | X | | | | |
| Copy a list of words about the mailman. Find their meanings in the dictionary. | X | X | | | | |
| Using the props in the box, act out a scene in which a mailman is walking on his route. | | | | X | | X |
| Make a mail sack. | | | X | | | |
| Make a map of a postman's route. | | | X | X | X | |
| Act out the role of the postman at work. | | | | X | X | X |

## Suggested Student Activities

### Function of the Post Office

| Description of Activity | Related Subjects | | | | | |
|---|---|---|---|---|---|---|
| | Reading and Language Arts | Writing | Creative Arts | Social Studies | Math | Socio-Dramatic and Communications |
| Make a schedule of mail pick-ups and put it on the mailbox. | | X | X | | X | |
| Find Frick School on a city map and draw the route to the Post Office. | | | X | | X | |
| Read the resource books and discuss them with others. | X | | | X | | X |
| Copy someone's address. | | X | | | | |
| Make a poster showing how to stamp a letter. | | | X | X | | X |
| Make an envelope. | | | X | | | |
| Weigh a package and compute the cost of mailing | | | | X | X | |
| Sell stamps to Post Office customers. | | | | | X | X |
| Write down the titles of all the books that you have read about the Post Office. | X | X | | | | |
| Copy a list of words relating to the Post Office. Look for the words in the dictionary. | X | X | | X | | |

Suggested Student Activities

Function of the Post Office

| Description of Activity | Related Subjects | | | | | |
|---|---|---|---|---|---|---|
| | Reading and Language Arts | Writing | Creative Arts | Social Studies | Math | Socio-Dramatic and Communications |
| Make a list telling how many stamps and envelopes have been made. | | X | | | X | |
| Using blocks, build a model of the Post Office. | | | X | X | | |
| Make a folder to hold the letters you have received. | | | X | | | |
| Make a poster showing different types of mail. | | | X | X | | |
| Make a birthday card and mail it to someone whose birthday is near. | | X | X | | | |
| Make a directory showing the addresses of everyone in the class. | | X | | X | | |
| Write a class letter together | | X | | | | X |
| Write a class diary telling about experiences at the Post Office. | | X | | | | |
| Read the resource books aloud and discuss them with the class. | X | | | | | |

## Suggested Student Activities

### Historical Information

| Description of Activity | Related Subjects | | | | | |
|---|---|---|---|---|---|---|
| | Reading and Language Arts | Writing | Creative Arts | Social Studies | Math | Socio-Dramatic and Communications |
| Read the resource books to the class. | X | | | X | | X |
| Make a poster showing mailmen through the history of Pittsburgh. | | X | X | X | | |
| Draw a picture showing how the Indians sent messages. | | | X | X | | |
| Find some pictures of historical mailmen in the resource books. Copy them on a large chart. | X | | X | X | | |
| Build a model of an early mail wagon. | X | | X | X | X | |
| Dramatize a pony express ride. | | | | X | | X |
| Make a poster showing different kinds of stamps which have been used in the history of the Post Office. (Several students might do this project together--with the help of the Librarian). | X | X | X | X | | |
| Build models of tools which might have been used in an early American Post Office. | X | | X | X | X | |

## Suggested Student Activities

### Transportation of Mail

| Description of Activity | Related Subjects | | | | | |
|---|---|---|---|---|---|---|
| | Reading and Language Arts | Writing | Creative Arts | Social Studies | Math | Socio-Dramatic and Communications |
| Draw pictures of vehicles used to carry mail. | | | X | X | | |
| Read the resource books to the class. | X | | | X | | |
| Get a map of the United States. Draw routes to show how mail moves from city to city. | | | | X | X | |
| Using blocks, build a mail train. | | | X | | | |
| Make a list of vehicles used to carry mail. Learn to spell the words. | X | X | | | | |
| Make a poster showing old and new kinds of mail carrying vehicles. | X | | X | X | | |
| Write a story about how mail is carried. | | X | | | | X |
| Trace a letter's route from the Post Office to your house. | | | X | X | | |
| Build models of some vehicles used to carry mail. | X | | X | | X | |
| Write a story about air mail flyers. | | X | | X | | |

The conceptual games are exploratory tasks clearly tied to the prescriptive curricula. A variety of games--some commercially available, others easily constructed from cardboard and other classroom materials--have been collected and adapted so that they provide students with the opportunity to practice objectives from the prescriptive curricula under informal game situations.

In keeping with the aims of the exploratory learning component of our program, the conceptual games are designed with three basic features: (1) the games are designed to give practice in several related concepts rather than the single objective of a given subject area, (2) a number of standard format games (e.g., Bingo, Old Maid, Lotto, etc.) are adapted to teach different concepts (the repeated use of the same format and rules reduces the amount of time students must spend in learning the rules and, thus, generally serves to make the games more easily useable by students independent of the teacher), and (3) all games involve two or more students, and thus demand social interaction beyond the level required by the prescriptive curricula. The following are some examples of conceptual games.

## NUMERAL WAR (0-5)

**Objectives:** Compare two numerals and determine which shows less. Q III E

**Number of Players:** 2

**Materials:** Twelve 3" x 3" cards, each containing a numeral. The cards are as follows:

| Numeral | Number of cards |
|---|---|
| 0 | 2 |
| 1 | 2 |
| 2 | 2 |
| 3 | 2 |
| 4 | 2 |
| 5 | 2 |

Two plastic cardholders approximately 15½" x ¾". The cardholders have a groove down the middle so that the cards may be held in place and displayed.

**Description of the Game:** The cards are divided between the players. The players turn over their cards, one at a time, and compare them. On each turn, the child with the numeral which shows less is the winner. The child with the most cards at the end of the game wins.

## SIZE WAR: Width

Objectives:
1. Identify appropriate size dimension (width).
2. Compare two objects by width and determine which is wider.
3. Use the terms wider (or fatter), narrower (or skinnier), and width.

Number of Players: 2

Materials:

A. Owls

24 laminated 5" x 4½" paper cards with drawings of owls in various colors. All owls are 4" tall. Their widths vary as follows:

- 4½" · 6 owls
- 3½" · 6 owls
- 2½" · 6 owls
- 1½" · 6 owls

B. Hippos

24 laminated 5" x 4½" paper cards with drawing of hippos. All hippos are 4" tall. Their widths vary as follows:

- 5" · 6 hippos
- 3½" · 6 hippos
- 2" · 6 hippos
- ½" · 6 hippos

C. Houses

24 laminated 5" x 4½" paper cards with drawings of houses in various colors. All houses are 4" tall. Their width vary as follows:

- 4½" · 6 houses
- 3½" · 6 houses
- 2½" · 6 houses
- 1½" · 6 houses

Description of the Game: Each child has a pile of cards. The children turn over their cards, one at a time, and compare them. On each turn, the child with the wider card is the winner. The children describe the cards using the term wider (fatter).

## BUILD IT TALL

Objectives:
1. Identify appropriate size dimension (height)
2. Compare objects and determine which is taller.

Number of Players: 3 - 6

Materials: A set of Giant Interlockers.

Description of the Game: The Giant Interlockers are placed in the center of the table. Say: "Build something tall." Have the students compare the completed structures and determine who has built the tallest one. The student with the tallest building is the winner.

## BINGO

Objectives:
1. Identify object
2. Name object
3. Match object
4. Describe object

Number of Players: 3

Materials:
1. 3 Find It Boards
2. Corresponding picture cards.

Description of the Game: Give each student a board. Deal out the picture cards in equal amounts to each player. Cards are placed, face down, in a pile in front of each player. Each player takes a turn as the caller. The caller picks up the top card on his/her pile and names the object, (i.e., "orange bed.") If a player has the picture that is called, he/she claims it and places it on his/her board. The first player to fill his/her card wins.